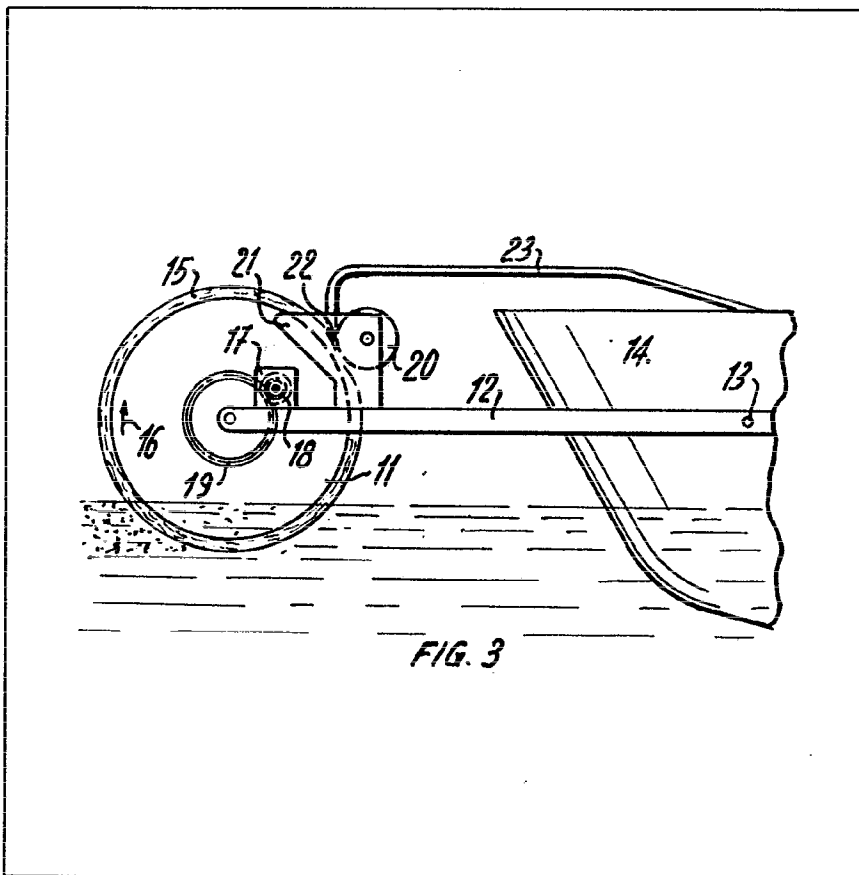


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(54) Removing floating oil from water

(57) Floating oil is removed by means of a bundle of textile fibres, e.g. 25% wool and 75% acrylic fibres. The bundle of fibres may be tied to a hoisting ring, the fibres being dipped in or moved across the floating oil and then hoisted to a wringing device comprising two pairs of counter

rotating rollers over an oil collecting tank. The bundle is then hoisted back to the floating oil. Alternatively the fibres are arranged on the surface of a rotating hollow drum 11 which is pivotally mounted on a boat 14 by supports 12. A roller 20 presses oil out of the fibres, the oil being sucked through pipe 23 to a container on the boat. Water drains off the fibres before they are squeezed to remove the oil.



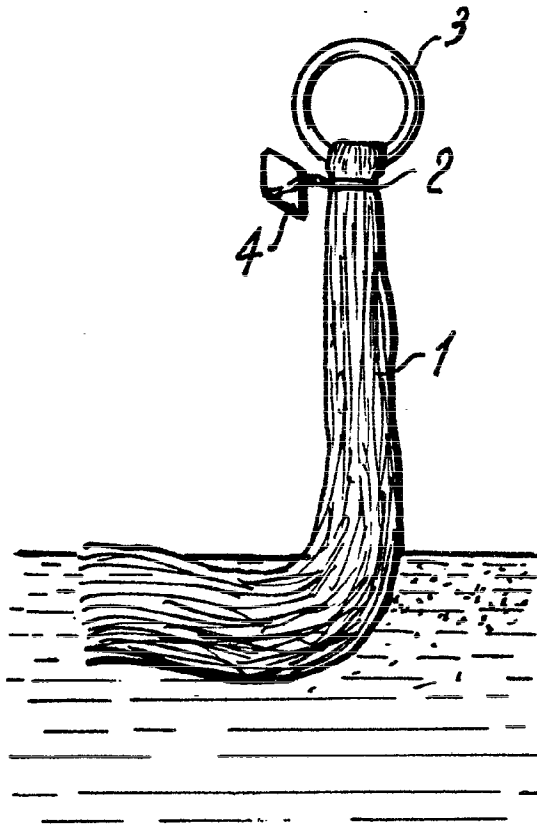


FIG. 1

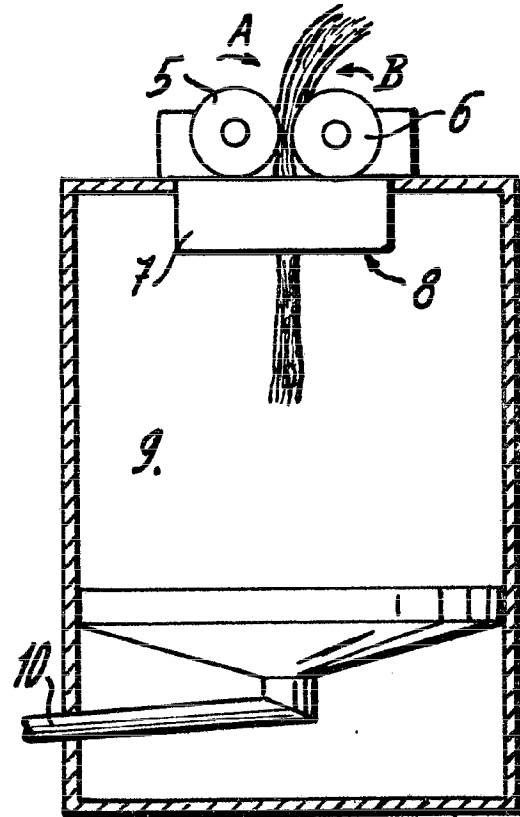


FIG. 2

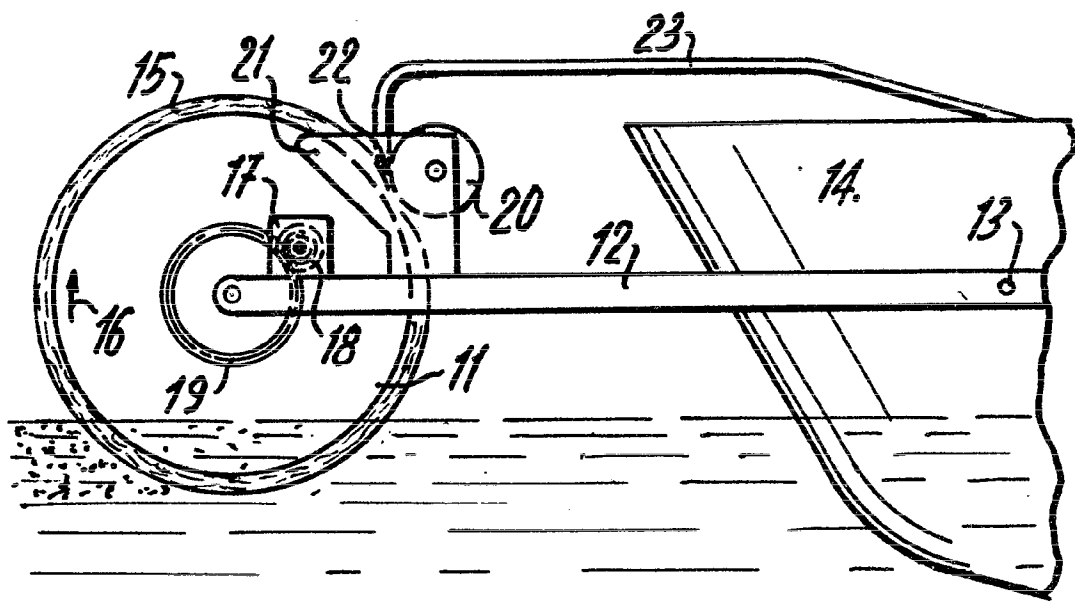


FIG. 3

SPECIFICATION

A procedure and device for cleaning the surface of water polluted by a sheet of oil

The present invention concerns a procedure for cleaning a surface of water polluted by a sheet of oil. It also concerns a device for putting this procedure into effect.

Until now no really effective means has been perfected for cleaning the surface of water polluted by synthetic or mineral oil, particularly crude oil. In particular, it has been observed recently that no procedure existed which would enable the recovery of a layer of fuel oil floating on the surface of the sea such as may occur by the rupture of the hold of a tanker run aground or sunk in mid-sea. It was necessary to wait until the "black tide" reached the coast and settled on the mainland in order to be able to eliminate the oil, which in practice was done by hand.

The present invention seeks to remedy these inconveniences by developing a procedure allowing the simple elimination of liquid or thick greasy bodies, such as oil and especially mineral oil, floating on the surface of water.

According to the present invention there is provided a procedure for cleaning a surface of water polluted by a sheet of oil, wherein a bundle of textile fibres is soaked at least partially in the sheet of oil, the bundle thereby laden with oil is withdrawn, water soaking the coil is allowed to drain off, the bundle is wrung in order to detach the oil, and the oil thus salvaged is collected, this series of operations being repeated.

The invention also provides a device for removing oil from the surface of water, which device comprises means for soaking in a cyclic way at least one bundle of textile fibres in oil-polluted water, means for withdrawing after soaking the or each bundle, means for wringing the or each bundle and for detaching the oil fixed thereto and means for collecting and for storing the oil thus salvaged.

Such a device can take a simple form permitting cleaning of small areas of polluted water or, according to a preferential production form, the device allows continuous cleaning of larger areas and is mounted at the stern and/or at the prow of a boat.

Embodiments of the apparatus and procedure of the present invention will be described by way of example with reference to the accompanying drawing in which:—

Figure 1 represents diagrammatically a production form of a bundle of textile fibres used in a procedure according to the invention;

Figure 2 illustrates a simple form of device for wringing the bundle and collecting and evacuating the salvaged oil; and

Figure 3 represents diagrammatically a device according to the invention mounted at the prow of a cleaning boat.

With reference to Figure 1, a device according to the invention comprises a bundle 1 of textile

fibres held in position by a knot 2 or by any other means to a hoisting ring 3 around which the bundle 1 is looped as shown. At this same upper end of the looped bundle is also fixed a float 4, for example in the form of a buoy or a ring. The textile fibres are constituted for example for 25% wool and 75% synthetic fibres, such as acrylic fibres, and can be knotted or held fast by some means or other about half-way up the bundle.

Referring now also to Figure 2, the device for wringing the bundle comprises essentially a first group of two cylinders 5 and 6 and a second group of two cylinders 7 and 8. The axes of cylinders 5 and 6 are parallel to one another and at right angles to the axes of the cylinders 7 and 8 horizontally beneath the cylinders 5 and 6. The whole unit is mounted at the upper end of a tank 9 for collecting the oil coming from the bundle during each wringing operation. At its lower end the receptacle 9 has a funnel with drain-pipe 10 which is connected to a reservoir (not shown).

In order to collect oil polluting the surface of a sheet of water, one or several bundles 1 are simply plunged in to or pulled across the surface of the water and withdrawn periodically. It is then observed that water that soaks the textile fibres drains off almost immediately as soon as the bundle hanging by the bearing ring 3 from a conventional hoisting device (not shown) is raised, but that greasy matter and especially oil or fuel oil remains fixed to the fibres of the bundle. In order to wring this bundle and detach the bulk of the oil, the lower end of the bundle is simply introduced in to the wringing device, i.e. between rollers 5 and 6 which are driven by hand or by a drive motor in opposing directions as shown by arrows A and B and between the cylindrical rollers 7 and 8 turning also in opposing directions. The rollers are arranged in pairs in such a way that they exert on the coil during the wringing operation sufficient pressure to squeeze out substantially all the oil absorbed by the fibres. This extracted oil falls to the bottom of the receptacle 9 and is evacuated by the drain-pipe 10. When the operator considers the coil to be sufficiently wrung, he takes the coil out of the wringing device either by releasing the cylinders, or by operating them in the opposite direction.

The series of operations is then repeated until the sheet of oil is removed.

It will be apparent that the device of Figures 1 and 2 cannot be operated continuously, and consequently can only be used for cleaning small surfaces of polluted water and for removing small quantities of polluting oil.

A device according to Figure 3, on the other hand, allows continuous operation and allows extensive surfaces of polluted water to be treated and a large volume of polluting oil to be salvaged. This device is made up of a cylindrical hollow drum 11, mounted on a horizontal axle whose ends are fixed to the free ends of two parallel supports 12. The two supports 12 can pivot freely around a fixed axle 13 solid with the prow or the

stem of a boat 14. The drum 11, which is hollow and mounted at the end of the supports 12, floats more or less on the surface of the water and is pushed or towed by the boat 14. At the peripheral

5 surface of the drum 11 is a fairly thick layer of textile fibres gathered together in bundles which constitute a coil 15 whose role is identical to that of the bundle 1 described with reference to Figure 1. The drum 11 is driven in the direction of arrow

10 16 for example by a drive motor 17 with an axle whose end carries a driving pinion 18 engaging with a gear ring 19 solid with the drum 11.

The device for wringing the coil 15 comprises a cylinder 20 whose axis is parallel to the axis of the drum 11 and whose peripheral surface presses against the coil 15 of the drum 11. The cylinder 20 have means for adjusting its pressure on the drum 11. A receptacle in which is collected the oil salvaged during the wringing of the coil 15 is constituted by part of the lateral walls of the drum 11 and the cylinder 20 and by two plane surfaces 21 parallel to one another which are mounted in contact with the bases of the drum 11 and the cylinder 20.

25 An evacuation device for removing oil salvaged and momentarily stocked in the receptacle comprises a suction casing 22 having a width approximately equal to the width of the drum 11 and of the cylinder 20. This casing 22 communicates with a suction pipe 23 which allows the salvaged oil to be pumped into a reservoir (not shown).

This device allows continuous operation. In fact, each time the drum rotates, the coil 15 attracts a certain quantity of oil floating on the surface of the water. When the coil is raised above the surface of the liquid, the water which soaks the textile fibres drains off spontaneously. The oil clinging to these same fibres is drawn

40 along to the wringing device where the pressure exerted by the cylinder 20 on the coil detaches the oil from the textile fibres. After having passed the cylinder 20, the coil is again available for a new work cycle.

45 The described procedure and device according to the invention allow quick and effective cleaning of an area of water polluted by a layer of oil and in particular a floating sheet of fuel oil.

CLAIMS

50 1. A procedure for cleaning a surface of water polluted by a sheet of oil, wherein a bundle of textile fibres is soaked at least partially in the sheet of oil, the bundle thereby laden with oil is withdrawn, water soaking the coil is allowed to

55 drain off, the bundle is wrung in order to detach the oil, and the oil thus salvaged is collected, this series of operations being repeated.
2. A device for removing oil from the surface of water, which device comprises means for soaking in a cyclic way at least one bundle of textile fibres in oil-polluted water, means for withdrawing after soaking the or each bundle, means for wringing the or each bundle and for detaching oil fixed thereto and means for collecting and for storing

60 the oil thus salvaged.
3. A device according to claim 2, wherein the means for wringing the or each bundles comprises two groups of two cylinders, two parallel to the two others, the cylinders of one of the groups having their axes at least approximately at right angles to those of the cylinders of the other group, and the groups of cylinders being mounted over an oil recovery receptacle equipped with an oil collector.

75 4. A device according to claim 2 or 3, wherein the means for soaking in a cyclic way the textile fibres comprises at least one rotary drum with a horizontal axis fixed at the free end of a pivoting support mounted on a boat in such a way that the drum partially floats in the polluted water, the said drum being equipped with a peripheral layer of the textile fibres, the means for wringing the or each bundle comprises a pressure cylinder turning in synchronism with the drum and pressing on the peripheral layer of textile fibres, the means for collecting the salvaged oil during the wringing of the or each bundle comprises two walls constituted respectively by the lateral surfaces of the drum and the pressure cylinder and two walls constituted by parallel plane surfaces at the bases of the drum and the pressure cylinder, and the means for storing the oil comprises at least one suction casing, an evacuation pipe and a reservoir placed in the boat.

90 5. A procedure according to claim 1 when performed using a device as claimed in claim 2, 3 or 4.